Northeastern Forest Experiment Station

Upper Darby, Pa.

BI-MONTHLY REPORT ON

FOREST INFLUENCES AND FLOOD CONTROL SURVEYS

October 1, 1950

FLOOD CONTROL SURVEYS

By Arthur Bevan

GENERAL

Rainfall was deficient in much of the Station territory during the past two months. Runoff on the other hand was in general above normal until the latter part of September when it fell below normal particularly in southern Maine, Massachusetts, and Connecticut. Ground-water levels were generally slightly below normal until the latter part of September when they started to rise.

Severe flash floods have been rather widespread and numerous during the period, occurring in New York, Vermont, Maryland, Virginia, and Kentucky.

Flash floods occurred near Friendship, N. Y., on August 4 and in the Hoosic River Basin in New York and Vermont on August 18 and 31. Peak discharge of the Walloonsac on August 31 was the second highest on record. Considerable damage was caused at Bennington, Vermont, and other locations by these storms.

Floods occurred in Maryland and Virginia the night of September 10. The main flood occurred in Kerrs, Buffalo, and Whistle Creeks, Virginia, where two lives were lost and damage estimated at $1,200,000 occurred. Local floods occurred in northeastern Kentucky as a result of heavy rains September 19-20. Peak discharge on Little Sandy River near Grayson was

the maximum of record. Several flash floods occurred in western New York the first two weeks of September occasioning new maximum stages where they occurred.

Water storage on the New York City watersheds is satisfactory with reservoir supplies at or above normal.

At the request of Mr. Wheeler of the Green Mountain National Forest, Bevan spent a day with Mr. Philip Shutler of the Vermont Water Commission and representatives of the National forest in the Bennington, Vt., area following the two flash floods. Cloudburst storms of high intensity on steep mountain slopes contributed enormous quantities of debris and bed-load, causing most of the trouble. A detailed study of watershed conditions would be needed to determine what could be done to control these mountain torrents. Stream bank cutting was very severe and much riprap and other stream bank control measures were swept away.

The comprehensive survey of the New England-New York rivers discussed in the last bi-monthly report has been approved and most of our time for the next two years will be spent on surveys in that territory. At the present time it appears that the comprehensive report will have to be completed by July 1, 1952. This means that studies of varying intensity will have to be carried out on some 14-18 watersheds in order to provide Departmental representatives with data for the comprehensive report.

SURVEY ACTIVITIES

A preliminary draft of the Merrimack Report is being reviewed in the Station. The Connecticut Report is still in Washington. Present indications are that it will be returned for discounting and for revisions proposed by the Chief's office.

The field work on the Salt River (Ky.) survey is well under way with three men from this office and a like number from the SCS office at Spartanburg, South Carolina, engaged in the land use inventory and development of the program. It is hoped that field work can be completed on this watershed by November 30.

STATUS OF F.S. SURVEYS

Connecticut River.--Report in Washington.

Merrimack River.--Preliminary draft prepared.

Allegheny River.--Work on preliminary draft started.

Monongahela-Upper Susquehanna Rivers.--No further action.

Salt River.--Field work in progress.

COOPERATION WITH SOIL CONSERVATION SERVICE

Both the Delaware and Youghiogheny Rivers reports are being revised in accordance with comments of the Chief's office.

Preliminary draft of the Roanoke River (Va. & N.C.) report has been received and is in process of review. Copies have been submitted to Washington Office, Southeastern Station, and Regions 7 and 8.

The PE Report and the work outline for the Lower Susquehanna have been completed and concurred in by the Station. Field work is underway with one man from the Station assigned to the forestry phases.

A PE report covering "All Streams in the States of North Carolina and Virginia Flowing into Albemarle and Currituck Sounds Between the Chowan River and James River" prepared by SCS, Spartanburg, has been reviewed and comments submitted.

PERSONNEL

Tom Clark has transferred from the Mountain State Research Center at Elkins, W. Va., and Joe Kidd from the Penobscot Research Center at Bangor, Maine, to the Division of Flood Control Surveys, at Upper Darby. Ken Clark has been transferred from the Division of Forest Management to Flood Control Surveys.

MEETINGS

The annual meeting of the Interstate Commission on the Delaware River Basin (Incodel) held at Shawnee-on-the-Delaware on September 11 and 12 was attended. The consulting engineers presented their report on the development of the water resources of the Delaware River to the Commission. Projects recommended were storage reservoirs to retain flood waters, diversions therefrom for water supply, and release to maintain minimum low water flows at Trenton, N. J., the limit of tidewater.

While Incodel has been active in promotion of land management and conservation, it is interesting to note that the consulting engineers' report made no mention of any land management measures in support of the proposed engineering projects.

DELAWARE BASIN RESEARCH CENTER

by Nedavia Bethlahmy

During this period, we completed two phases of our work at the Dilldown Watershed, and started a new project. In addition, the routine collection and analysis of hydrologic data were kept up to date.

Boundary Survey

Reigner completed a map of the boundary of the Dilldown Watershed, and located on this map the several climatic, hydrologic, and soil moisture installations. The area of the watershed is 1531.6 acres. The boundary was marked on the ground, and now the State of Pennsylvania is clearing a fire lane along the boundary of the watershed.

Interception and Stemflow Studies

Reigner and Price completed the establishment of interception and stemflow installations. Interception installations are located both at Dilldown (scrub oak area) and the Pocono forest (high forest area). Stemflow installations are only at the Dilldown area. Data are now collected regularly.

Soil Moisture Studies

The calibration of soil moisture units installed last year at Dilldown is now complete, and tables for converting field data into inches of water have been prepared.

Following is an outline of the method which was used to calibrate the units.

A preliminary study revealed that the original structure of the soil must be retained in order to obtain valid calibration curves. For this reason, extreme care was exercised to disturb the soil samples as little as possible. Small monel cans (as described in the Manual of Instructions issued with the Colman meter) were taken to the field, and from each soil horizon that was to be sampled, a small piece of soil was cut to fit into and fill the cans. At the same time, each horizon was sampled for moisture content in order to provide data for determining the dry weight of the soil.

The thermistor coefficients marked on the fiberglass units by the manufacturer proved to be unreliable. Hence, new coefficients had to be determined. This was done by immersing the units in water at room temperature, and taking water temperature aid and thermistor resistance readings.

As described in the manual, each soil sample was saturated and a fiberglass unit inserted. Resistance and weight data were taken. The samples were then fanned with an ordinary fan for less than a minute. The samples were then placed in an airtight chamber at 98% humidity for 24 hours. Later, as the soils became drier the period of fanning was gradually increased to ten minutes. By this means we were able tc control effectively the loss of moisture from each sample. Mineral soil was reduced each time by one percent; organic soil (humus) by about seven percent. This process of measuring resistances and weights and then drying was repeated daily. Only one set of data were obtained each day to allow the moisture in the soil a sufficient amount of time to reach a stage of equilibrium throughout the soil mass.

The laboratory data resulted in curves shaped like those in the Manual of Instructions, except that the first major inflection occurred approximately one logarithmic cycle higher. Corrected resistances were computed on an alinement chart constructed for the purpose. This chart will be available at an early date from the Northeastern Forest Experiment Station, at Upper Darby.

At each site selected for installing the units, a pit was dug with as small a diameter as possible. Different soil horizons and depths were kept separated on different sheets of Kraft paper. In addition, the location and position of large rocks were noted. The units were installed in the sides of the pits in the horizon and depth for which they were calibrated. Color coded wires connected each unit to a panel board located in a shelter. To prevent rain water from flowing along a wire and eventually reaching a unit, each set of wires was extended to a point deeper than the unit to which it was attached, and brought to the surface on the opposite side of the hole. During and after the installation, extreme care was taken to disturb the site as little as possible. Soil was replaced in each pit so as to return each horizon to its proper depth and rocks replaced in their original positions.

After the units were installed a series of simultaneous resistance and actual soil moisture data were taken. For each unit, the differences between field and laboratory percentages were averaged, and the laboratory curve then shifted in the direction indicated. Thus, the shape and slope of the curves were determined accurately in the laboratory, but their location on the moisture percent axis was determined in the field.

Meetings and Visitors

Storey met with representatives of the Pennsylvania Department of Forests and Waters at Harrisburg to discuss the research program at Dilldown.

Bethlahmy was in New Hampshire to attend the Northeastern Forest Soils Conference.

Langbein, Graham, and Mangan of the U.S.G.S. and Ibberson and Pyle of the Pa. Dept. of Forests and Waters spent a day and a half going over the watershed study on the Dilldown area. They went over the work plan in great detail and inspected most of the installations. The general consensus of opinion appeared to be that the study was well planned and being satisfactorily carried on.

Reports

Storey was assigned the task of writing the U.S.D.A. Potomac Report for the President's Water Resources Policy Commission.

Reigner reports that liming at Dilldown does not affect the natural regeneration of pine. Limed and unlimed areas do not differ in the number of germinated pitch pine seedlings.

Plans are being prepared to publish a pamphlet describing the Delaware-Lehigh Experimental Forest, what projects are being carried on, and giving any results to date.

Personnel

Storey, while on leave in California, was detailed for one week at the San Dimas Experimental Forest.

Coughlin and Knecht, temporarily employed during the summer as field assistants, completed their assignments during the middle of September. Coughlin, as part of his work in soils at Lehigh University, will spend a few hours each week assisting Bethlahmy.

Storey has transferred his headquarters to Upper Darby, but will continue in charge of the Delaware Basin Branch. The office at Bethlehem will be maintained.

MOUNTAIN STATE RESEARCH CENTER

By George R. Trimble, Jr.

George R. (Dick) Trimble was transferred to the Mountain State Research Center from the Division of Flood Control Surveys on August 6. He will work on the watershed studies and other forest influences projects.

The weirs and stream-gaging stations have been installed on the five watersheds to be used in the watershed management studies. The finishing touches are now being made. Stream-gaging and rain-measuring equipment are being installed.

A report has been completed on a study to determine tree species suitable for the revegetation of strip mine spoil banks in West Virginia. The basis of the report was a field survey made last year at representative spoil banks in this state. This report is being edited and reviewed. It is expected that it will be published as a Station Paper.

The Northeastern Forest Soils Group at its annual conference, held this year in Durham, New Hampshire on September 7 and 8, voted to hold the 1951 meeting in Elkins, West Virginia. The Mountain State Research Center will be host to this group and will arrange a field program with special emphasis placed on the effect of topography on forest site.